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THE HYPOTHALAMUS AND HUMAN EMOTIONS*

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Place an animal outdoors in a howling blizzard and its first reaction will be to find shelter, its second to find food, and having found these, its third will be to gratify its sexual appetite.

Having completed this cycle, it is satisfied.

Place a member of the species homo sapiens in a like situation and fundamentally his reactions will be identical. But his achievement of satisfaction may be far from complete for several reasons. The shelter may not be to his liking—the roof may leak, the bed squeak, or perhaps he doesn't like the neighbors. The food may be distasteful—the chicken tough, the potatoes underdone, and the spinach full of sand. His Eve may be an incompatible and emotional blot on the horizon of the Garden of Eden, due to her own dissatisfaction with the house she lives in, the clothes she wears, the food she eats or the fact that her Adonis has not the physique of a Tarzan, the polish of a Ronald Coleman, the impetuosity of a Clark Gable, the amorous grunts of a Charles Boyer or the endurance of a Casanova.

In brief, it appears that the gift of reasoning has rendered more complex and more difficult the process of achieving emotional satisfaction from a simple sense of internal well-being.

Is it a fact that in achieving civilization we are losing our most precious faculty—the ability to be happy? What is wrong with our way of life in America? We are the best fed, the most luxuriously housed, the best dressed, nation in the world, but in spite of these obvious advantages, we have too many discontented people in our midst.

Is it a paradox that the farther away we move from the animal scale, the less capable we are of achieving emotional satisfaction and happiness from living?

It is no commendation for our system that our asylum population is increasing or that the wards of our hospitals and the waiting rooms of our physicians are filled with complaining, wretched creatures unable to find emotional satisfaction and happiness in life because their minds have become a battlefield of incompatible ideas, and their bodies a hotbed of dysfunction aided and abetted by pills, nostrums, epsom salts, bicarbonate of soda or an occasional exploratory laparotomy by some curious individual attempting to determine how so many complaints could arise out of one abdominal cavity.

The time has passed when the regular practitioners of medicine can shrug their shoulders and push these neurasthenic derelicts out of the office with a pat on the back and a bottle of Mist. Ferri Malt. I know, because I tried it a few years ago and invariably found these patients returned to my doorstep within a week. Since I did my own dispensing in those days, I am quite sure it wasn't the Mist. Ferri Malt that brought them back.

Why then did they return?

First, because they were no better, and second, because they had not told the whole story of their illness or because I had neglected to get the whole story.

What are we going to do with these cases of functional disorder? We cannot send them to neuro-psychiatrists for diagnosis or treatment. For one thing, there are not enough neuro-psychiatrists to go around, and for another, these people constitute at least half of the average medical practice.

The old family physician's horse sense and knowledge of family background may have

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helped him with these cases as far as preventing absurd mistakes in diagnosis, but his horse sense rarely ever helped him solve the complex mental problems troubling his patients, and it almost never suggested a method of treatment.

Studies of the autonomic nervous system and its hypothalamic centers of control carried out during the past ten years have done a lot to advance our ideas of the relationship between organic function and emotion on one hand and cerebral activity and emotion on the other.

THE DEVELOPMENT OF THE CENTRAL NERVOUS SYSTEM

In the embryonic development of any animal a definite pattern is followed wherein the changes encompassed in a few weeks or months of embryonic life are representative of every change that has taken place in the evolutionary history of the animal.

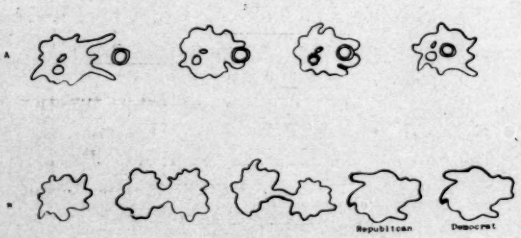
The cells making up our tissues do not possess any function not possessed by the simplest cell in existence thousands of years ago. These functions are:

(a) the ability to react to a stimulus,
(b) the ability to assimilate food,
(c) the ability to move,
(d) the ability to reproduce.

All that evolution has accomplished during successive ages has been in specialization of each of these four functions and the delegation of specific functions to certain tissues.

It is interesting to follow the development of this specialization without which even the simplest forms of life would live with difficulty and without which the higher forms could not exist.

Fig. 1

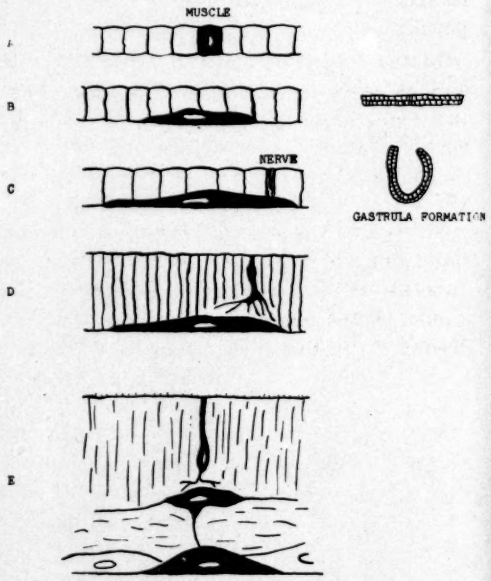


AMEBA

Primitive cellular functions
(a) The ability to react to a stimulus
(b) The ability to assimilate food
(c) The ability to move
(d) The ability to reproduce

The simplest form of life was the unicellular organism, such as in primitive ameba. Such an organism possessed all four functions of living tissue. It responded to a stimulus by assimilating the stimulator (if such happened to be food) or by withdrawal if the stimulus was harmful. Carried along in a friendly stream of water, it was quite unconcerned with its environment or destiny and spent its time devouring the delicious tidbits that floated its way or in reproducing republicans or democrats according to the laws of pure chance.

Fig. 2



DEVELOPMENT OF NEUROMUSCULAR MECHANISM IN SPONGES AND SEA ANEMONES

Life was not quite so simple for the sponges and sea anemones. Nature had already begun to specialize. The republicans being in favor of a high tariff were assigned to the cuticle where they could protect the interior from the action of surrounding objects. The democrats stayed back on the farm and specialized in muscle. This situation was satisfactory until the democrats began to migrate beyond the Alleghenies. Fearful of losing

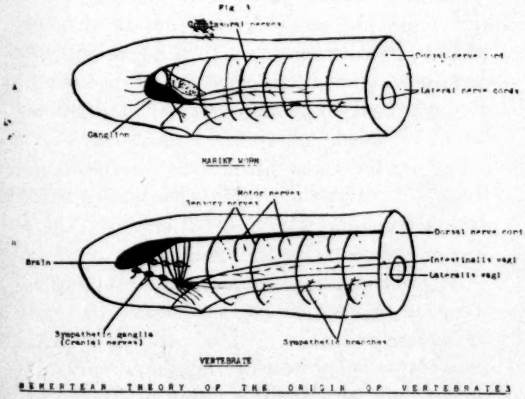
contact, some of the republicans began to elongate.

These elongated republicans were the beginning of our nervous system.

The point to remember is that the development of the nervous system was secondary and was in no way necessary to either cuticle or muscle. Each could function without the other. This independence of cellular action is retained throughout the developmental scale and, however complex our structure has become, the unit of function is still the cell. In the development of malignant tumors, cells are merely reverting to a primitive reproductive cycle, possibly in response to excess local nutrition brought about by a local blood vessel reaction to some form of irritation—physical, chemical or hormonal.

In the marine worm, the republicans, unable to agree on a platform, have split up; the high tariff group remaining with the cuticle, the remainder joining the lateral or dorsal nerve cords with a headquarters in Chicago.

In Figure 3A we see the nervous system is beginning to centralize and coordinate the function of the muscles to enable the segments of the worm to move in an orderly fashion in its search for food or more suitable



REMERTEAN THEORY OF THE ORIGIN OF VERTEBRATES

environment. The placing of the cerebral ganglion near the esophagus would indicate the establishment of a mechanism whereby the arrival of food at the head end will result in cessation of muscular activity as long as the food stimulus is present. The inhibiton of muscular movement is the central nerve mechanism's chief contribution to digestion, and contact with food is probably the only stimulus necessary to activate the digestive tract.

In the worm, the formation of an anus completes the transition from a gastrula type of digestive system, as in the sponge, to the simple digestive tube where the food is taken in at one end and extruded at the other.

Figure 3 also illustrates the nemertinean theory of the origin of vertebrates.

A. represents diagrammatically the elemental parts of the nervous system of the marine worm which is made up of two lateral cords and often a smaller mid-dorsal cord, the three being bound by commissural nerves which run around the animal. A branching intestinal nerve proceeds from one of the lateral cords and is distributed to the sides of the intestines, and from the ventral portion of some of the anterior commissural nerves small nerve branches appear, also distributed to the intestinal wall.

B. In the typical vertebrate this nerve mechanism has modified. The dorsal nerve cord has become the central nervous system with the formation of a brain at the mouth end. The original ganglion of the lateral nerves have broken up into the various ganglia associated with the cranial nerves. One of these persist in lower vertebrates as the lateral nerves of the vagus system. The commissural nerves may alternate in sensory and motor function while the small intestinal branches coming from the ventral portions of the commissural nerves may form the sym pathetic system.

Since the ability of any species to survive depends chiefly on an ability to withstand its environment and an ability to defend itself against its enemies, each stage of animal evolution has been accompanied by the development of certain reflexes whose prime function is to protect the tissue or organ from which the sensory part of the reflex arises. Broadly speaking, reflexes concerned with the taking of food or mating may also be classed as protective reflexes.

These reflexes may be classified according to their site of origin beginning with the most primitive part of the nervous system (the spinal cord) and ascending until the upper limits of the brain stem are reached.

SIMPLE REFLEXES

I. *Mediated through the spinal cord*

(a) Protective reflex (simple segmental reflex arc) — a noxious stimulus (burn) is followed immediately by withdrawal of part affected.

(b) Splanchnic motor reflex—the lateral splanchnic motor cell columns of the cord connect by means of the white ramus with the sympathetic ganglion distributing motor impulses to the smooth muscle of the blood vessels and intestine. These nerve connections may give rise to increase or decrease of motor activity when a simple protective reflex is called into play.

II. *Mediated through the medulla oblongata*

(a) Protective reflexes
- (1) Coughing reflex
- (2) Sneezing reflex
- (3) Vomiting or regurgitating reflex

(b) Food reflexes
- (1) Swallowing reflex
- (2) Salivary reflex
- (3) Sucking reflex

III. *Mediated through the pons variolli*

(a) Protective reflexes
- (1) Mandibular—tapping chin followed by raising of lower jaw.
- (2) Nasal—tickling inside of nose results in contraction of facial muscles on the same side.
- (3) Supra-orbital — percussion over orbit results in the reflex closure of the eye on the same side.
- (4) Conjunctival—closing of eyelid when conjunctiva or cornea is touched.
- (5) Auditory—any sudden loud noise causes momentary closing of both eyelids.
- (6) Audito-oculogyric—a sudden loud noise is followed by a turning of both eyes in the direction of the sound.

(b) Food reflexes
- (1) Activation of the muscles of mastication.
- (2) Activation of the submaxillary and sublingual glands,

In general the reflexes mediated through the pons are protective for the head region or are concerned in the taking of food and its preparation for swallowing.

IV. *The Midbrain*

(a) Protective reflexes
- (1) The direct light reflex—closing of pupil in response to bright light.
- (2) The consenual light reflex—light in one eye causes contraction of other pupil.
- (3) The emergency light reflex—follows exposure to a very bright light —closure of the eyelids, lowering of the eyebrows. It may be combined with contraction of all the face muscles, bending of the head, and a drawing of the forearm across the eye (as artists depict soldiers near exploding shell).

(b) Food and protective reflexes
- (1) Accommodation and convergent reflexes—changing distant vision to close vision is accompanied by contraction of the pupil so as to sharpen the image on the retina.
- (2) The oculo-cephalo-gyric reflex—directs the eyes and head in the interest of visual attention—maintains the gaze in a fixed position.

To sum up

We have in the spinal cord, medulla, pons, and midbrain many nerve centers through which various stimuli act to produce reflexly certain reactions concerned in the protection of the animal or in its search for, and assimilation of, food. A spinal animal can carry out these reactions without any cerebral activity. The type of reflex action is constant and unvarying for each stimulus, the response always being the same.

A spinal animal has all the sensory organs it needs to keep it informed as to the state of its environment. It has all the reflexes needed for its protection, for the assimilation of food, or for the procreation of its species. In fact, it has everything we have except a brain and the right to vote.

As long as the animal lived in water this mechanism by which it survived its environment and dealt with its enemies was adequate.

The transition of animal life from water to land, however, was of necessity followed by tremendous changes in the structure and

function of certain organs with further specialization of tissues.

This transition gave rise to:

(1) A need for different means of locomotion, resulting in the formation of limbs.

H (2) The need for improved means of *defense or offense* and the search for food resulted in a great improvement in existing sense organs. The short-sighted eye of the fish was replaced by one favoring distant vision. The sense of smell and hearing also became adapted to an air environment.

(3) The replacement of gills by a lung structure for breathing and enclosure of the latter in the thoracic cavity.

H (4) The need to control the amount and composition of the body fluids.

(5) The development of special glands to moisten and lubricate dry foods so as to aid swallowing.

H (6) Special methods of protecting the young (egg shell—uterine protection).

H (7) Temperature control — feathers, hair, vasomotor reaction to prevent or increase heat loss (sweating, panting, shivering, etc.).

All of these changes required an enormous expansion in the nerve cells and association tracts to record and correlate the multitude of new sensory stimuli. The various sensory organs and the nuclear centers in the spinal cord, medulla, pons, and midbrain were adequate for recording these stimuli, but a great increase in the correlating centers became necessary; hence, the development of a primitive brain. It is interesting to note that the control of at least four of the seven transitions that took place when animals moved from sea to land are still to be found in the part of the primitive brain that persists in humans. These four are marked with an H.

This primitive brain persists in all higher animals, forming the diencephalon of the embryonic brain and the thalamus and hypothalamus of the adult brain. The diencephalon forms a relatively large part of the brain even up to the third month of fetal life; whereas, in the adult, the size of this part of the brain is relatively insignificant.

In primitive vertebrates the diencephalon constituted a region for the correlation of sensory impulses and provided the sensory combinations necessary for the formation of feeling tone (analogous to muscle tone) in the animal. It was thus essential to the formation of conditioned reflexes and the instinctive reactions. It also provided the trigger action that sets off the intense organic activity associated with the fight or flight mechanism necessary for the animal's preservation in dangerous situations. One single sensory stimulus, such as the sight or smell of an enemy, could set off a mass reaction that simultaneously prepared every organ necessary for the animal's defense.

This function of the primitive brain evolved through the development of association tracts, and the great increase in the size of the human cerebrum has been due to the tremendous increase in the number of association tracts in the brain.

If intelligence were to be judged anatomically, the number of association tracts in a brain, more than the amount of gray matter, would be the index of reasoning power.

It is interesting to consider what a tremendous number of association tracts or pathways become necessary as we increase the number of senses from *one* to *five*, limiting the number of sensory discriminations for each sense to four. The number of possible pathways that a sensation from A could take to arrive at B, (See Fig. 4) when there is free association (choice of one pathway alone or any combination of the four pathways), is fifteen. Where there is free association between the pathways of different senses, the number of possible pathways rises rapidly as additional senses are added, reaching a figure of 759,375.

Four sensory discriminations for a single sense are, of course, a ridiculously small number. The mere mention of the words "juicy steak" may recall to your mind somewhere between thirty and fifty sensory discriminations associated with those two words. Consider a few of these associations.

Visual association—size, shape, thickness, color, texture, fat or lean, plus the various vegetables usually eaten with steak, or even some hotel or restaurant where steaks are a specialty on the menu.

Olfactory associations — raw meat odor, cooked meat odor, hot fat, frying pan odor,

open fire odor, onions, mushrooms, plus various condiments and sauces.

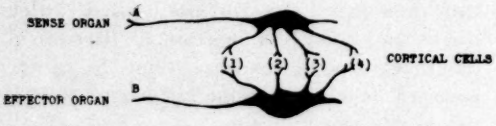
Auditory associations—sizzling, sputtering, bubbling of gravy.

Fig. 4

THE DEVELOPMENT OF ASSOCIATION AREAS IN THE CEREBRUM

HYPOTHETICAL CASE WHERE THERE ARE ONLY FOUR POSSIBLE SENSORY DISCRIMINATIONS FOR EACH OF FIVE SENSES

(1)	TACTILE SENSE	WET, DRY, HOT, COLD
(2)	TASTE	SWEET, SALT, SOUR, BITTER
(3)	SMELL	FOOD, PERFUME, IRRITANT, OFFENSIVE
(4)	VISION	DISTANCE, COLOR, SIZE, SHAPE
(5)	HEARING	DIRECTION, INTENSITY, PITCH, TIMBRE



THE POSSIBLE PATHWAYS THAT A SENSATION FROM (A) COULD TAKE TO ARRIVE AT (B) WHEN THERE IS FREE ASSOCIATION (CHOICE OF ONE PATHWAY ALONE OR ANY COMBINATION OF THE FOUR PATHWAYS) = 15. WHERE THERE IS FREE ASSOCIATION BETWEEN THE DIFFERENT SENSES THE NUMBER OF POSSIBLE PATHWAYS RISES RAPIDLY AS ADDITIONAL SENSES ARE ADDED.

TACTILE	15	PATHWAYS POSSIBLE
PLUS TASTE	225	" "
PLUS SMELL	3,375	" "
PLUS VISION	50,625	" "
PLUS HEARING	759,375	" "

Taste associations—meaty taste, salt, fat, butter, onions, mushrooms, french fried potatoes, and various condiments.

Tactile and muscle sense associations—cutting with knife, texture, fibre, tender or tough, sensations of swallowing.

Multiply this simple example by hundreds of thousands and it becomes apparent what a large number of association paths are necessary to give us the wide range of sensory discrimination that we possess.

Originally the diencephalon was both the coordinating and correlating center of the nervous system, but with the development of the cerebral hemispheres, its function as a correlating center has shifted forward to the cerebrum. but it still retains its coordinating function of the autonomic nervous system and control of the internal environment. The diencephalon coordinates the visceral movements and secretion just as the cerebellum coordinates complex muscular movements.

Herein lies the importance of the diencephalon and particularly the hypothalamic portion of the diencephalon, for this area still retains its trigger function in setting off the complex body reactions present in the fight or flight mechanism of lower animals. These organic reactions in humans give rise to the feelings or emotions associated with fear, rage, anger, hate, love, or jealously. In other words, when someone succeeds in activating our hypothalamus they really hit us where we live.

One of the main functions of the hypothalamus is its role in the production of the complex body reactions associated with fear and anger. Dr. George Draper, in his book "Disease and the Man," points out that "when we boil down our various emotions, such as fear, anger, love, hate, jealousy, pride, and even those concerned with our sex life, they all represent some form of *fight* or *flight* in the last analysis."

The primitive emotion of fear, which is indispensable to the preservation of life, has become greatly expanded in humans. Combined with other memory associations which have entered into experience, fear may give rise to the many behavioral reactions of caution necessary to escape or avoid the embarrassments of life. The primitive emotions of anger and feeling of self-regard, underlying the instinctive reaction of attack or aggression, may similarly be so combined in experience as to become the incentive for those complex behavioral acts necessary to make and maintain a place in the social organization. The primitive emotion of parental feeling is capable of great expansion in psychic combinations within the cerebral cortex where it develops into the sentiment of sympathy and fraternal feeling. Yet, however complex they may become, these psychic combinations of the cerebral cortex are fundamentally dependent upon the hypothalamus and thalamus for their primitive source of affective energy.

The far-reaching influence of this expansion in consciousness of the primitive emotions is a very important factor in the development of human behavior and human society. These possibilities of expansion, however, are not without their disadvantages and

danger. The emotion of fear, the sexual emotion, as well as other emotions, may become pathologically expanded and result in such marked deviations as to give rise to an extensive group of nervous maladies known as a neurosis or psychosis—*the neurasthenic derelicts of everyday practice.*

If you remove the cortex of an animal, such as a cat, as was done by Cannon and Britton, the animal on recovery from the anesthetic behaves in a remarkable way. It lashes its tail, the hairs stand erect, the claws protrude, the pupils dilate, and the animal struggles, bites, and spits as if it were in a terrible rage. This phenomenon is termed "sham rage," and has been shown that "sham rage" is accompanied by sweating, greatly increased respirations, and a sharp rise in blood pressure. Most of these manifestations you will recognize as being sympathetic in origin, and it has been shown that there is an increased liberation of adrenalin.

This type of reaction can be produced by merely cutting the nerve connections between the higher centers in the cortex and the hypothalamus (a section through the hypothalamus about the middle of the tuber cinereum is effective). It seems that normally the hypothalamus is inhibited by the cortex and "sham rage" results when this cortical inhibition is removed. When an animal is in this state, even the mildest stimulus, such as jarring the table or lightly touching the animal, is sufficient to provoke a paroxysm of rage.

Since most of our emotions represent some form of the fight or flight complex, they will produce all or some part of the physiological changes that occur in moments of fear or anger.

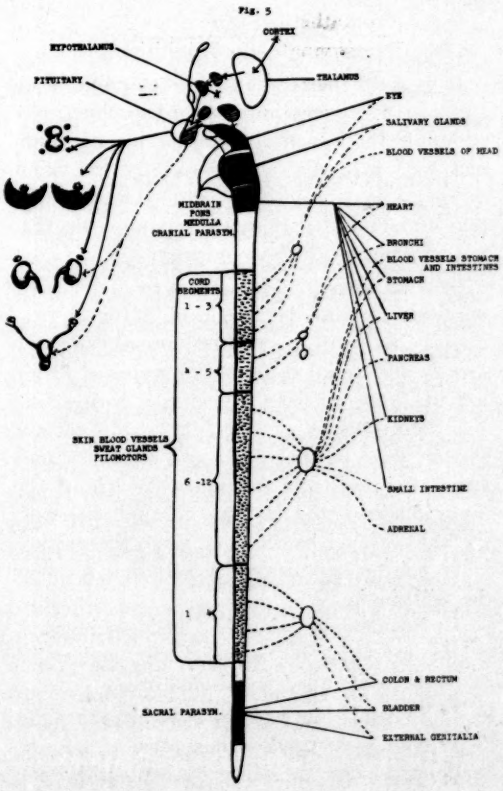
Almost everyone has experienced the unpleasant sensation that accompanies a sudden fright—the sense of constriction in the throat, the goose pimples, the tendency for the hair to stand on end, the holding of the breath. These are all manifestations of the sympathetic nervous system preparing the individual for fight or flight. This complex reaction is stirred into activity by the various nuclei in the hypothalamus and the associated glands of the sympathetic system.

Such activity of the entire sympathetic system is necessary when an animal is suddenly forced to defend itself. The muscles require six to ten times more blood to supply the necessary glycogen and oxygen. If the muscular effort is prolonged, more glycogen must be obtained from reservoirs in the body and more oxygen by increasing the rate of breathing. The rise in blood pressure accompanying fear or anger is accomplished by vasoconstriction as well as by increased adrenalin secretion.

This intense activity of the sympathetic system is accompanied by inhibition of the parasympathetic system controlling the digestive processes, since these are not needed during the time the animal is engaged in defending itself.

Figure 5 shows diagrammatically the extensive control of our viscera exercised by the hypothalamus through the centers in the midbrain, pons, and medulla, as well as through the pituitary and associated glands.

Under the stimulus of fear or anger, the



entire sympathetic system is thrown into action.

The pupil of the eye dilates (SS).

The salivary glands are inhibited and the mouth becomes dry (PI).

The blood vessels all over the body constrict, with the exception of the coronary vessels of the heart (SS).

The force of the heart beat increases; the rate, conductivity, and excitability also increase (SS).

The smooth muscle of the bronchioles relaxes (PI).

The sphincters of the stomach contract (cardiac and pyloric) (SS), and the secretion of gastric juice is inhibited (PI); so also is the pancreatic secretion (PI).

The motility of the small gut is inhibited (PI), and the sphincter contracts (ileocecal) (SS).

The adrenals secrete adrenalin.

The motility of the colon is inhibited (PI), and the sphincter ani contracts (SS).

The sphincters of the bladder and vagina contract (SS).

(SS—Sympathetic Stimulation)

(PI—Parasympathetic Inhibition)

It is quite clear from the foregoing that any disease or emotional disorder which will stimulate the hypothalamic area in an abnormal way will give rise to exactly the same sympathetic overactivity and parasympathetic underactivity that accompanies the primitive emotion of fear or anger.

On this basis, it is not hard to understand why our present day mode of living is producing so many so-called functional disorders, for we all suffer to a greater or lesser extent from anxiety states concerning our past, our present, or our future. In certain people these normal fears and apprehensions become chronic and dominate the life of the individual so that he goes through life perpetually afraid he will not make the grade.

In college he worries himself sick for fear he will flunk.

In business he takes his business home at night, eats with it, sleeps with it, and wakes up with it stamped on his features.

If a chemist, he worries over his prospects, his inability to predict or control certain reactions; whether he will get a bonus this year, next year, or ever; whether his group leader will steal his ideas and patent them, or whether his group leader will ever think one of his ideas worth patenting.

If he is a physician, he may lie awake at night wondering if this or that diagnosis is correct and whether he might not have done better by a certain patient.

Stenographers and secretaries to executives frequently develop anxiety states. Years of catering to the personal fads, fancies, and idiosyncrasies of an executive, who may himself be poorly balanced emotionally, may be sufficient to send susceptible women off the deep end.

Individuals so affected not only experience a state of anxiety mentally; they also experience it in the functional activity of their internal organs and live virtually in what we would call a continuous state of physiological fear. No wonder they have indigestion, constipation, nervousness, headaches, heartaches, bellyaches, and if the emotional tension persists long enough they may develop gastric ulcers, high blood pressure, or other organic diseases.

Why these pathological fears affect one individual's digestive system, another's blood pressure, a third's sex life, a fourth's psychological balance is, no doubt, linked up in developmental history of the individual as well as by the particular part of the involuntary nervous system most activated by the complex.

Certain people who have great difficulty in releasing their aggression (fight complex) through the usual routes find that their emotional energy is expressing itself in some system of the body, such as the cardiovascular system. This inward expression is carried out through the sympathetic system causing vasoconstriction and resulting in increased tension; hence, the common expression when someone loses his temper: "Watch your blood pressure!".

When hypertensive patients are studied from a psychological standpoint it is found that there is often a great deal of conflict in their make-up and an inability to express their aggression (fight complex) directly. If these people could only "haul off and knock the block off" of the object of their rage,

either physically or verbally, they would avoid the necessity of taking it out on their circulatory system. Instead, they politely "tell the boss to go to hell" under their breath.

If married to a nagging, complaining husband or wife, they sit across the breakfast table outwardly silent and polite, but inwardly boiling with a repressed desire to heave the grapefruit across the table. Incompatible marriages are very often associated with inhibited aggression complexes. A worker who is incompatible with his job usually suffers from an inhibited aggression complex.

A young woman patient, quoted in Weiss and English's "Psychosomatic Medicine," whose history had been one of much family conflict, had great difficulty in talking to people. When asked if she ever got angry she replied: "Yes, but I can never do anything about it. I rehearse what I am going to say to the person who makes me mad, but when I meet that person, I just can't say anything. A lump sticks in my throat. I break down and cry. It is because I feel that I may make a fool of myself I have become more and more quiet."

It is often a big surprise to the family physician to discover Mr. Jones has high blood pressure. Mr. Jones leads such a quiet life—no business worries—never drinks or smokes—never asks an opinion—rarely ever gives one. It would be less surprising to the physician if he had been aware of the fact that the man's sexual inclinations during his entire married life had been in India's coral strands while his wife's were hovering around Greenland's icy mountains. In addition, his wife was extremely selfish, and inconsiderate in other ways. For twenty years this man had been harboring an unexpressed resentment at having to live in a home where there was neither affection nor family life. The resentment, unexpressed outwardly because of the man's desire to keep peace in the home and because he had certain rigid ideas of duty, had repeatedly expressed itself inwardly. The blood pressure changes were merely the response of his fight mechanism stimulated by the resentment.

This type of organic reaction to an unpleasant situation is very similar to the type of mental reaction that occurs when part of a mental conflict is entirely repressed and the individual does not allow the incompatible idea to enter his conscious thought. A case quoted by Bernard Hart in his "Psychology of Insanity" is a good example of this.

"A certain individual residing near a church was daily infuriated by the sound of the chimes that rang out the hour of the day. He raged inwardly and outwardly, and carried petitions from door to door to have the church bells stopped. On investigating the individual, it was discovered that he wrote poetry, so also did the clergyman in charge of the church in question, whose poetry was much more in demand. The jealousy resulting in the individual was extremely painful to his personality, and the complex was sternly repressed and forced out of his conscious thought. As a result the complex found expression in an indirect way and the bell episode was the result. The individual could not express his jealousy openly without insulting his ego, but his complex found a way to express itself by picking on something associated with his poetical rival."

What a different world it would be if we only had the guts to say to ourselves: "So and so can do this thing better than I can —so what?", and not waste our mental energy worrying about it.

The jealous poet projected his resentment on the bells; the other poor devil took it out on his cardiovascular system. Another case quoted by Dunbar in her book on "Emotions and Bodily Changes" was that of a patient who was peculiarly sensitive to noises of all kinds and, unable to exclude them, developed a transitory hypertension whenever the thumping of a defective radiator in her apartment woke her up early in the morning. She described her sensations as those of "a completely senseless rage-reaction to the repeated insult" to her senses which she had no way of stopping.

Such are examples of abnormal reactions produced by the fight complex from which we derive our aggression, rage, hate, resentment, jealousy, and other like emotions. These types of reactions are most apt to occur in

people with what Draper calls the gall bladder type of constitution, whereas the flight mechanism from which we derive our fear, caution, apprehension, anxiety are more apt to occur in the asthenic gastric ulcer type.

Fear activating the hypothalamus, which in turn gives rise to overactivity of the sympathetic system may, among other things, produce spasms of one or more of the various body sphincters.

The feeling of a lump in the throat or inability to swallow are two examples due to pharyngospasm. Pyloric spasm will be followed by delayed emptying of the stomach. Spasm of the anal sphincters favors the production of constipation. Spasm of the muscles about the vulva gives rise to vaginismus and dyspareunia. These are all just manifestations of fear, either acute fear arising from some overwhelming event or chronic fear as it occurs in the anxiety neurosis.

The sex problem enters into the life of every individual, and the struggle to sublimate sex instincts and make them conform to social custom has a marked effect on our mental stability. Restraint of these instincts gives rise to fear in a peculiar way: fear that sexual relationships contrary to social custom may expose the offender to his own and public criticism, or fear that venereal disease may result from such relationships. In women the fear of pregnancy, with or without benefit of clergy, always exists. The bulk of man's emotional difficulties with sex usually comes before marriage and the bulk of woman's usually comes after.

These fears and their emotional tension act through the hypothalamus to produce an upset in physiological balance the same way as any other fear, as the following case history will testify:

A graduate student in the second year of his studies for a Ph. D. in Chemistry and a certain young lady, holding down a fair job in the interior decorating department of a large store, decided that it was better to marry than burn, and since two could live as cheaply as one (though half as well) they proceeded to get married.

His income from a fellowship amounted to $50 a month, and hers was $125 a month. This seemed quite adequate since he had only a little over a year to go and had already the promise of a position at $224.65 a month.

Prior to the marriage she had read a book on marriage and sex life from "kiver to kiver" and had been greatly impressed by the simple exposition of the planned family.

After marriage, he was no longer oppressed by the heavy burden of the flesh which nature puts on all of us to insure the continuation of the race. No longer did the driving of Plato's team tax his energies to the limit for the black horse passion and the white horse reason now trotted amiably side by side pulling in the same direction.

With her things were not quite so rosy. First of all her reference book had failed to mention that certain periodic functions were apt to become somewhat irregular under psychic stimulation. Consequently, she was never sure just where she stood and the mere thought of trying to eat, pay rent, and bring up a baby on fifty dollars a month sent shivers up her spine. At times she was apt to be a little bit irritable until hubby began to wonder.

However, there is a Providence that smiles on children, drunkards, and intellectual people, and their problem turned out to be psychological rather than physiological.

In due time, the couple moved to Wilmington, where the rentals amazed them and the price of meat appalled them. Hubby's $224.65 looked just like $224.65 at the beginning of the month, and at the end of the month it looked like nothing at all.

Nevertheless, she decided to have a baby. The chapter in her reference book on when to have a baby was explicit. In the planned family, whenever you wanted a baby you just had one—what could be more simple.

One month, two months, three months slid by—nothing happened. She read two more chapters in the good book—still nothing happened. Twice hubby awakened in the middle of the night to find her crying. Again he began to wonder and worry. A year passed by and by this time she was nervous, unhappy, and at times greatly depressed. She did not eat or sleep properly and was losing weight.

It took several weeks of treatment to get this woman out of her depressed phase. How

much her anxiety state influenced the functional chain made up by the hypothalamus, pituitary, and ovaries, and interfered with ovulation, is hard to say. Many women pass through unexplainable periods of sterility lasting from a few months to several years. The history of this couple is not unusual and there were several periods of mental strain and emotional stress arising out of the biological urge of which sex is only a part.

SUMMARY

I have tried to show that in the evolution of our nervous system the predominant trend has been along the lines of protecting the animal—first, by a simple reflex arc through the segments of the spinal cord, and later through centers in the medulla, pons, and midbrain; second, by means of a primitive brain (the diencephalon) wherein all the reactions necessary for fight or flight could be activated at the same time following an appropriate stimulus; and last, by the exercising of the caution and judgment gained through the record of our experience in the cerebrum.

It would appear then that our central nervous system has evolved like the old prairie farmhouse, by the addition of anatomical outsheds to the original one-room shanty.

The question now arises: "Where do we go from here?".

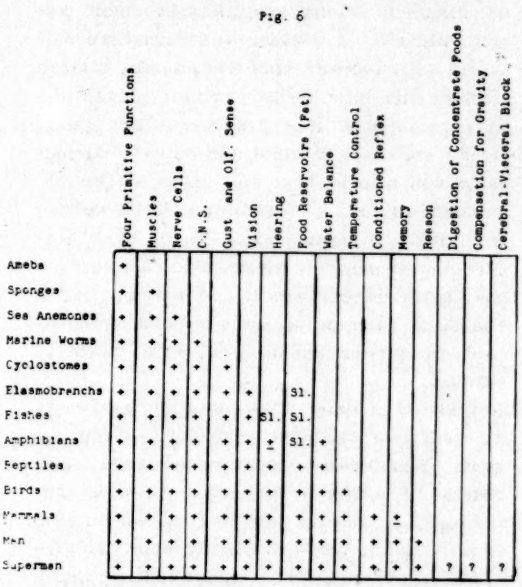
Are we really biologically incapable of discarding any function once it has satisfied the traditions established by our ancestors of the primordial ooze?

Even though we cannot discard a function completely, we certainly are capable of modifying it to such an extent that it no longer resembles its primitive ancestor.

Figure 6 shows the gradual specialization of the four primitive functions of the cell in the process of evolution. As you will note, I have, in comic-strip fashion, gone one stage beyond our present state, though I do not wish you to confuse my "Superman" with the Nazi variety, although the latter has already attempted the digestion of ersatz foodstuff.

Firstly, we have not had too much experience in digesting concentrated foodstuffs; by that I mean concentrations far beyond anything occurring in the body fluids. Honey we have eaten for a few thousand years: sugar, for about six hundred years. Will we evolve a digestive system capable of handling many concentrated foods in the next hundred thousand years?

Fig. 6



Secondly, our superman will have to develop a circulation better adapted to our upright position. The present mechanism of returning venous blood from the lower extremities to the right side of the heart against gravity is poor and would fail completely were it not for our periods of sleep in the horizontal position. An efficient circulation will be one in which the blood will be pumped completely around the circuit by the heart and not just half way.

Thirdly, our greatest defect is that we have in the hypothalamus a very elaborate control mechanism for our defense, most of which we do not need in civilized life and which interferes decidedly with our ability to reason by impressing its feeling tone on our higher centers.

If you do not believe this, just try and enjoy a movie or a concert with a full bladder. Just try and solve a difficult problem after eating a full meal. Many individuals can stand concentrated study for only a limited period of time before their muscles become so tense they are driven to blow off

steam one way or another. It is this inability to relax during prolonged mental activity that frequently gives rise to astonishing sexual binges in otherwise quite respectable college students. I venture to say that we will evolve some block mechanism whereby a large part of the tone feeling originating in the hypothalamus will be prevented from interfering with our thought processes. The reverse will also be true and many of the distressing, annoying, pestiferous, petty, of-no-account-fears, rages, jealousies or other disturbing impressions associated with our social, moral, and business life will no longer bombard our hypothalamus in such a way as to keep our insides in a constant state of turmoil.

There is evidence that evolution is already at work on just such a change. Even the most pessimistic neuropsychiatrists and others interested in this field estimate that not more than fifty per cent of the population is made up of constitutionally inadequates, neurasthenics, psychesthenics, schizophrenics, maniac depressives, or just plain ordinary everyday screwballs.

How do the other fifty per cent get along?

Captain Alexander Rush has an article published in the October 23, 1943, issue of the *Journal American Medical Association* on "Gastrointestinal Disturbances in the Combat Area." The group of army men under study (some 713,000 selectees) had been classified under the army general classification tests which classify all soldiers in terms of their ability to learn their duties in the service.

The soldiers were divided into five groups:

Group I Very rapid learners — about 7% of the men in the army
Group II Rapid learners—about 24%
Group III Average learners—about 38%
Group IV Slow learners—about 24%.
Group V Very slow learners—about 7%

Those who made high scores (Groups I and II) are usually those who do best in the various army training courses and excel in their daily duties in the service. Those who make low scores (Groups IV and V) are inclined to be less alert and are likely to encounter difficulty in adapting themselves to new situations.

It was found in this study that the greater number of patients with functional digestive disturbances are found in Groups IV and V (the slow learners), while the occurrence of purely functional disorders in Groups I and II (the rapid learners) is extremely rare.

These findings indicate that digestive disturbances of the functional types are seldom seen among bright, alert, well-integrated persons.

Has this one-third of our population already evolved a mechanism whereby external events and emotional stresses arising out of our daily life are prevented from stimulating the hypothalamic area of the brain and are thus able to protect their digestive systems from the unnecessary overstimulation or inhibitions that give rise to functional disorder? Have they developed this mechanism because they are more intelligent, or are they more intelligent because the mechanism prevents them from frittering away their mental energy in useless worry, fear, anxiety, anger, or resentment?

I merely raise these questions without attempting to answer them.

I am not going to delve further into the field of psychosomatic medicine. I do feel that it is not only one of the most important fields of modern medicine but also has an important bearing on the field of industrial medicine. Certainly, many of the circulatory abnormalities we detect in employees are directly traceable to influences outside their occupation. Our wage and disability costs may be kept unduly high by paying too much attention to the somatic component of an illness and disregarding the psychic factor. This tends to prolong convalescence and encourage a reaction of chronic invalidism. Furthermore, many of our major and most of our minor accidents occur in the below-par, badly-integrated group of workers.

The impression I get after reading such books as Dunbar's "Emotions and Bodily Changes," Weiss and English's "Phychosomatic Medicine," Alvarez' "Nervousness, Indigestion and Pain" is that, no matter what label is attached to the particular nervous disorder under study, the fundamental symptom is unhappiness and an inability to enjoy life.

In America we are constitutionally endowed with the right to life, liberty, and the pursuit of happiness. Constitutionally then our patients ought to be happy.

Perhaps you do not believe that chronic unhappiness is a symptom, or perhaps you believe it is such a common symptom that it is too indefinite to evaluate. I do not agree. It is my belief that chronic unhappiness only arises when one or more of the three primitive biological requirements or their human modifications are not being fulfilled.

Everyone ought to enjoy eating.

Everyone ought to enjoy work either through pleasure in the work itself or through the things that work can bring. If not either, the job is unsuitable or the things it brings are inadequate.

Everyone should be able to find pleasure in the complexes that are built around our sexual instincts. There is no use hoping to circumvent or sidetrack these instincts. They are built so firmly into our brain that nothing short of a complete section through the medulla will remove them and even then I have my doubts. Don't misunderstand me, I am not suggesting immorality as a solution for this phase of human discontent. That has and will continue to be an individual problem, but I do think that any civilization such as ours that continues to ignore this cause of emotional tension has a lot to learn.

We fail to achieve happiness in this life because we fail to drag our mental conflicts and fears, imaginary or real, out into the open. We would be much happier if we recognized the hates, jealousies, and discords in our daily life and in recognizing them beat them over the head with a mental club until the battleground of the cerebrum is covered with dead and dying incompatibilities.

We can never achieve happiness if we feel on awakening that life is a burden or a bore. Such feelings can only mean that we are in the wrong job or we have been neglecting our mental machinery.

Lastly, we can never achieve happiness if we are beset by anxiety and worry about the future. As Carlyle has said: "Our main business is not to see what lies dimly at a distance but to do what lies clearly at hand."

If we, as physicians, can guide even one neurasthenic derelict into a happier way of life, we will have done a job; even more, we will have gained a friend.

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A. C. S. War Sessions

Twenty-two cities distributed throughout the United States and Canada have been selected by the American College of Surgeons as headquarters for one-day War Sessions to be held in March and April, 1944. Advancements in military medicine and developments in civilian medical research and practice under the spur of the war emergency will be presented by authorities representing governmental agencies and by civilian physicians and surgeons.

The meetings will be open to the profession at large, including medical officers of the Army and the Navy, residents, interns, medical students, and executive personnel in hospitals. For the latter special hospital conferences, to be held simultaneously with the scientific sessions, are being arranged. Those who plan to attend the War Sessions may select the meeting which in place or time is most convenient, regardless of the states and provinces which, for the purpose of organization, are designed on the schedule as participating in a given meeting.

The United States Army, Navy, Public

Health Service, Veterans Administration, Procurement and Assignment Service, and the Office of Civilian Defense, are assigning representatives to participate in the meetings. In Canada, the corresponding agencies are likewise assigning official representatives. Experience of medical officers who have been on active duty in combat zones will be especially featured. In the hospital conferences, such agencies as the War Production Board, the War Manpower Commission, the American Red Cross, and groups interested in student nurse recruitment, will be represented.

Each meeting will open at 8:30 a. m. with the showing of official U. S. Army and U. S. Navy films on medical and surgical subjects, such as evacuation of the wounded, fractures, bomb blast, burns, and treatment of wounds. From 9:30 to 11:30 Army and Navy representatives who have been on active duty abroad will report; from 11:30 to noon representatives of the Public Health Service will report on measures for the control of endemic and epidemic diseases. Current problems of the Procurement and Assignment Service will be presented by a representative at the luncheon conference from 12:15 to 2:00 o'clock. Between 2:15 and 5:00 p. m., three scientific presentations by medical members of the armed forces and by civilian members of the medical profession will be made; a scientific presentation will be made by a representative of a medical service in industry; and the program for veterans will be presented by a representative of the Veterans Administration. From 5:00 to 5:30 p. m. the need for protective services in time of war will be presented by a representative of the Office of Civilian Defense. The concluding session will be a dinner meeting and open forum with all participants in the day's program as the panel of experts to lead discussion of any and all subjects presented during the day together with other problems of interest to the medical and hospital professions. The motion picture showing, public health service session, luncheon conference, civilian defense program, and the dinner meeting and open forum will be attended by both the medical and hospital groups. The hospital representatives will discuss wartime hospital problems and how they are being solved, from 9:30 to 11:30 a. m., and will hold a round table conference on "Wartime Hospital Service" from 2:15 to 5:00 p. m.

The schedule for the meetings follows:

Monday, February 28, Winnipeg, Manitoba, Saskatchewan, The Fort Garry.

Thursday, March 2, Minneapolis, Minnesota, North Dakota, South Dakota, Hotel Nicollet.

Saturday, March 4, Des Moines, Iowa, Nebraska, Missouri, Hotel Ft. Des Moines.

Monday, March 6, Chicago, Illinois, Wisconsin, The Stevens.

Wednesday, March 8, Cincinnati, Ohio, Kentucky, Indiana, West Virginia, The Netherland Plaza.

Friday, March 10, Detroit, Michigan, Hotel Statler.

Monday, March 13, Rochester, New York State, The Seneca.

Wednesday, March 15, Toronto, Ontario, Royal York.

Friday, March 17, Montreal, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland, Mount Royal Hotel.

Monday, March 20, Springfield, Massachusetts, Maine, New Hampshire, Vermont, Rhode Island, Connecticut, Hotel Kimball.

Wednesday, March 22, Philadelphia, Pennsylvania, New Jersey, Delaware, The Bellevue-Stratford.

Friday, March 24, Baltimore, Maryland, District of Columbia, Virginia, Lord Baltimore Hotel.

Monday, March 27, Jacksonville, Florida, Georgia, North Carolina, Eastern Tennessee, The George Washington.

Wednesday, March 29, Jackson, Mississippi, Louisiana, Western Tennessee, Alabama, Hotel Heidelberg.

Saturday, April 1, San Antonio, Texas, New Mexico, Mexico, The Gunter Hotel.

Tuesday, April 4, Tulsa, Oklahoma, Kansas, Arkansas, The Mayo.

Friday, April 7, Denver, Colorado, Wyoming, Western Nebraska, Cosmopolitan Hotel.

Tuesday, April 11, Salt Lake City, Utah, Idaho, Hotel Utah.

Friday, April 14, Spokane, Washington, Northern Idaho, Oregon, Montana, The Davenport Hotel.

Tuesday, April 18, Vancouver, British Columbia, Alberta, Hotel Vancouver.

Monday, April 24, San Francisco, Northern California, Nevada, Mark Hopkins Hotel.

Thursday, April 27, Los Angeles, Southern California, Arizona, The Biltmore Hotel.

Editorial

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MARIHUANA

In recent years there have been many newspaper accounts of the great danger threatening America from marihuana, (hemp) addiction. One brutal murder by two young women was said to be the result of their smoking of marihuana. Other lurid accounts have told of the prostitution of school children through selling them marihuana cigarettes. Now it seems that such tales have had no basis in fact. An editorial in *The Military Surgeon* entitled "The Marihuana Bugaboo" contains the following statement:

"It is the writer's considered opinion that the smoking of the leaves, flowers, and seeds of *Cannabis sativa* is no more harmful than the smoking of tobacco, or mullein, or sumac leaves, or any of the other plants that have been used for the purpose. There appears to be the occasional individual who, having smoked this plant, prefers its mild exhilaration to that of tobacco, but they are most exceptional. Ordinarily after the first curiosity is satisfied, tobacco is much preferred.

"It is further considered that the legislation in relation to marihuana was ill-advised, that it branded as a menace and a crime a matter of trivial importance. It is understood that this legslation is, furthermore, a serious detriment to the development of a hemp fibre industry in this country. Finally it is hoped that no witch hunt will be instituted in the military services over a problem that does not exist."

Probably most physicians will be as surprised as the writer that America faces no menace from marihuana. It is a great source of gratification that this is so and that there is no danger of the wrecking of children's lives through a too lively curiosity in the smoking of hemp.—F. C. S.—Editorial, *Phila. Med.*, Jan. 8, 1944.

We, too, share the relief expressed in Editor Smith's last paragraph *if* the editor of the *Military Surgeon* is right, for within recent memory there was some alarm in Wilmington over the alleged peddling of "reefers" or "mary janes," to the pupils of our senior and junior high schools.

However, it is neither wise nor scientific to go all out for a new thesis, unless it be most thoroughly documented. We still retain the fear that some of the many medico-legal cases charged up to marihuana were bona fide. Davidson (Synopsis of Materia Medica, Toxicology and Pharmacology, 2nd Edition, 1942, p. 260) states "It is important to recognize that both the prolonged use by habitues, and the single large dose taken by a novice may cause criminal, maniacal acts. Moreover, even small quantities can destroy the will power and the ability to connect and control thoughts and actions, thus releasing all vicious inhibitions." So, till the article in the *Military Surgeon* can find corroboration, it may be well to assume that the final word on this subject has not yet been said.

Army Hospital Train

Forerunner of others to come, a ten-car hospital train for the United States Army Medical Corps has just been completed and is now in use for training purposes in Southern California before going to a combat area overseas.

The ten-car, all-steel train was built at a cost of $135,000 by the Pullman-Standard Company, and is illuminated throughout with fluorescent lamps in a variety of fixtures all specially-designed and engineered by Sylvania Electric Products, Inc., under special dispensation of the War Production Board.

Staffed by five medical officers, seven nurses and 33 enlisted men, the train is the last word in modern equipment and design for the transport of casualties. Narrower and shorter than standard-sized American railroad cars, the cars of the hospital train were especially constructed to roll on the sharp curves, and steep inclines of foreign tracks. Four cars are for personnel, 220-volt generators and steam boilers for heating and ventilating, kitchen-dining and pharmaceutical facilities.

Six of the cars are ward cars, each providing berths for sixteen bed patients, or more "sit-up" patients with the double-decker berths folded down. In the center of each ward car is an emergency operating area, a cleared space free of berths. Stretchers may be carried into the train through double-size doors in the center of the car, placed on portable standards, and used as an operating table without transfer of the casualty.

At these points, as throughout the train, four-foot fluorescent lamps, set in recessed ceiling reflectors furnish the illumination. Army specifications called for fluorescents for their advantages: they are cool, glareless and eliminate undesirable shadows. For the greater convenience of surgeons at work over a patient, and for the greater comfort of patients when the train is in hot climates, the Sylvania installation has been highly commended by medical men and the general public. The train made a series of stops for public inspection enroute across the country from Boston.

From the lighting point of view, the train is apt to be a prototype for widespread post-war railroading.

Sylvania was called in by Pullman, at the Worcester, Mass., plant and asked to do the job. Because the installation was for a train that was to be all-steel, an advantage at the battlefront, it was decided that the fluorescent fixtures should be steel. But about a year ago the WPB asked all manufacturers to reduce the amount of metal in any single fluorescent fixture to the absolute minimum and Sylvania developed a fibre-type reflector. For the hospital train, however, WPB cooperated and permitted steel construction. An exhaustive series of tests preceded the installation. Each of the different types of fixture was put on a vibration machine, specially designed. The entire lighting fixture, including reflector, lamp, starter, sockets, ballast and wiring was subjected to as many as a thousand rough vibrations per minute, varying from a sixteenth to a half-inch cycle. Only then was the apparatus okayed.

Although Medical Corps officers aboard the train said there was no official information on additional trains to be built, it has been rumored that an order for many more hospital trains is nearly ready for official announcement.

Diabetic Identification Tags

At the suggestion of the Medical Division of the U. S. Office of Civilian Defense, to prevent dangerous delay in diagnosis and to insure proper treatment during unconsciousness or coma, Eli Lilly and Company, Indianapolis 6, Indiana, in cooperation with the American Diabetes Association, will provide metallic identification tags to be worn by diabetic patients or carried in the pocket. The inscription reads "DIABETIC, If Ill Call PHYSICIAN." No advertising of any sort appears on the tags, which will be supplied to the medical profession on request.

OBITUARY

JOHN W. JAMES, M. D.

Dr. John W. James, of Dover, died of heart disease at Fort Lauderdale, Florida, on December 14, 1943, aged 70 years. He was born at Ocean View, on September 17, 1873, a son of John W. and Anne (Otwell) James.

Dr. James received his education in the public schools of Sussex county and at the Wilmington Conference Academy in Dover. He then pursued the study of medicine at the Jefferson Medical College, Philadelphia, from which he graduated in 1895 with the degree of doctor of medicine.

Upon leaving college Dr. James established himself in the practice of medicine at his home town of Ocean View. One year later, in 1896, he moved to Roxanna. In 1911 he located in Dover, and on the opening of the Kent General Hospital there became surgeon to that institution. Dr. James retired from practice in 1929.

He was a member of the American Medical Association, the Medical Society of Delaware, of which he was president in 1922, the Kent County Medical Society and the Philadelphia Medical Club.

Dr. James was a member of Doric Lodge, No. 30, A. F. & A. M., of Millville, of which he was Past Master; Kent Chapter, No. 8, Royal Arch Masons, Dover; St. John's Commandery, No. 1, Knights Templar, Wilmington; Lu Lu Temple, Nobles of the Mystic Shrine, Philadelphia, Evergreen Forest, Tall Cedars of Lebanon, Milford.

On August 2, 1894, Dr. James married Mayretta Evans, of Ocean View. Mrs. James died on July 4, 1935. He married his present widow, who was Norma Whitener, of Miami, Fla., on September 16, 1937.

The funeral, which was delayed two days because of the North Carolina train wreck, was in charge of Union Lodge, No. 7, A. F. and A. M., with the Rev. William Edge, pastor of People's Christian Congregational Church, officiating. Interment was in Lakeside Cemetery, Dover, on December 19, 1943.

BOOK REVIEWS

Health Education on the Industrial Front, The 1942 Health Education Conference of the New York Academy of Medicine. Pp. 63. Cloth. Price, $1.25. New York: Columbia University Press, 1943.

In recognition of the intense industrialization of our population caused by the war effort, the 1942 Health Education Conference of the New York Academy of Medicine was devoted primarily to the consideration of problems arising from modern industrial conditions. These papers deal with the opportunities and obligations of health educators and others in the industrial health field, and reflect current practical experience, in war industries, in such matters as nutrition promotion, the control of physical illness, the restriction of mental disabilities, and the limitation of accidents. The subjects are: The Wartime Intensive Industrialization of the Community and Its Health Implications; Food and Nutrition in the Home and in the Work Place; Disease and Handicap Detection and Control in Industry; Mental Problems and Morale in Industry; Educational Methods and Control of Accidents in Industry.

Health educators, industrial physicians, doctors, nurses, health officers, and social workers will find this volume both stimulating and useful.

The Sources of Life. By George Voronoff, M. D. Pp. 240; Cloth. Price, $3.50 Boston: Bruce Humphries, Incorporated.

This book concerns some phases of the endocrine glands, with special reference to the monkey gland transplantations of a quarter of a century ago, initiated by the author. Those "transplants have never achieved medical respectability," and today are unnecessary because of the synthetic estrogens and androgens now available. The book will be of interest only to those who are interested in the historical evolution of the subject.

1789—MEDICAL SOCIETY OF DELAWARE—1944

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COMMITTEE ON CRIMINOLOGIC INSTITUTES

M. A. Tarumianz, Farnhurst
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COMMITTEE ON REVISION OF BY-LAWS

W. E. Bird, Wilmington
C. L. Hudiburg, Wilmington
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ADVISORY COMMITTEE, WOMEN'S AUXILIARY

D. D. Burch, Wilmington
C. E. Wagner, Wilmington
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REPRESENTATIVE TO THE DELAWARE ACADEMY OF MEDICINE

W. O. LaMotte, Wilmington

WOMAN'S AUXILIARY

MRS. E. L. STAMBAUGH, *President*, Lewes

MRS. G. C. MCELFATRICK, *Vice-Pres. for N. C. County*, Wilmington
MRS. I. W. MAYERBERG, *Vice-Pres. for Kent County*, Dover
MRS. JAMES BEEBE, *Vice-Pres. for Sussex County*, Lewes
MRS. S. W. RENNIE, *Recording Secretary*, Wilmington
MRS. L. L. FITCHETT, *Corresponding Secretary*, Milford
MRS. A. J. STRIKOL, *Treasurer*, Wilmington

NEW CASTLE COUNTY MEDICAL SOCIETY—1944

Meets Third Tuesday

C. C. NEESE, *President*, Wilmington.
L. B. FLINN, *President-elect*, Wilmington.
J. J. CASSIDY, *Vice-President*, Wilmington.
C. L. HUDIBURG, *Secretary*, Wilmington.
J. M. MESSICK, *Treasurer*, Wilmington.
Board of Directors and Nominating Committee: B. M. Allen, 1944; I. L. Chipman, 1945; A. J. Strikol, 1946.
Delegates: 1944: E. M. Bohan, Ira Burns, J. J. Cassidy, C. H. Davis, C. C. Neese, P. R. Smith, M. A. Tarumianz, B. S. Vallett, G. W. Vaughan, N. W. Voss. 1945: L. W. Anderson, B. M. Allen. T. H. Baker, L. B. Flinn, G. W. K. Forrest, C. L. Hudiburg, W. W. Lattomus, J. D. Niles, C. E. Wagner, J. S. Keyser.
Alternates: 1944: Julian Adair, George Boines, J. W. Butler, K. M. Corrin, G. H. Gehrman, W. L. Gray, J. F. Hynes, E. L. Krieger, J. C. Pierson, L. J. Rigney. 1945: D. D. Burch, I. L. Chipman, D. T. Davidson, J. R. Downes, J. W. Kerrigan, R. J. Heather, L. C. McGee, Douglas Gay, Lawrence Phillips, C. E. Maroney.
Board of Censors: W. E. Bird, 1944; L. J. Jones, 1945; L. J. Rigney, 1946; Ira Burns, 1947; N. W. Voss, 1948.
Program Committee: L. B. Flinn, C. C. Neese, J. J. Cassidy.
Legislative Committee: J. D. Niles, G. W. Vaughan, W. O. LaMotte, E. H. Lenderman, C. M. Lowe.
Necrology Committee: J. A. Shapiro, C. E. Maroney, L. S. Hayes.
Auditing Committee: Charles Levy, A. J. Heather, J. F. Hynes.
Public Relations Committee: C. E. Wagner, L. J. Jones, M. B. Pennington, R. A. Lynch, F. E. Spencer.
Medical Economics Committee: W. E. Bird, D. D. Burch, L. W. Anderson, J. C. Pierson, W. G. Ryon.

KENT COUNTY MEDICAL SOCIETY—1944

W. C. DEAKYNE, *President*, Smyrna.
F. R. EVERETT, *Vice-President*, Dover.
H. W. SMITH, *Secretary-Treasurer*, Harrington.
Delegates: C. J. Prickett, I. J. MacCollum, William Marshall, Jr.
Alternates: Stanley Worden, S. M. D. Marshall, A. V. Gilliland.
Censors: H. V'P. Wilson, H. W. Smith, W. T. Chipman.

DELAWARE ACADEMY OF MEDICINE—1944

Open 10 A. M. to 1 P. M.
Meeting Evenings

W. H. KRAEMER, *President*.
E. R. MILLER, *First Vice-President*.
I. D. BROWN, *Second Vice-President*.
D. T. DAVISON, SR., *Secretary*.
J. M. MESSICK, *Treasurer*.
Board of Directors: C. M. A. Stine, J. K. Garrigues, W. S. Carpenter Jr., H. A. Carpenter, F. H. Gawthrop, Mrs. Ernest du Pont, H. G. Haskell, S. D. Townsend, L. B. Flinn.

DELAWARE PHARMACEUTICAL SOCIETY—1944

Honorary Presidents: Walter L. Morgan, Wilmington; George W. Rhodes, Newark; Albert Dougherty, Wilmington.
President: H. S. Kiger, Wilmington.
First Vice President: G. M. Sparks, Clayton.
Second Vice President: C. E. Johnson, Newark.
Third Vice President: E. A. Truitt, Rehoboth.
Secretary: Albert Bunin, Wilmington.
Treasurer: Albert Dougherty, Wilmington.
Board of Directors: H. S. Kiger, Wilmington; E. D. Bryan, Dover; C. E. Johnson, Newark; W. L. Longendyke, Seaford; F. P. Ragains, Milford.
Legislative Committee: Thomas Donaldson, chairman.

SUSSEX COUNTY MEDICAL SOCIETY—1944

N. R. WASHBURN, *President*, Milford.
H. S. RIGGIN, *Vice-President*, Seaford.
A. H. WILLIAMS, *Secretary-Treasurer*, Laurel.
Delegates: Bruce Barnes, K. J. Hocker, D. V. James, R. S. Long.
Alternates: F. A. B. Allen, H. S. Le Cates, H. S. Riggin, E. L. Stambaugh.
Censors: O. V. James, J. R. Elliott, U. W. Hocker.

DELAWARE STATE DENTAL SOCIETY—1944

J. A. CASEY, *President*, Wilmington.
P. K. MUSSELMAN, *First Vice-Pres.*, Wilmington.
MORRIS GREENSTEIN, *Second Vice-Pres.*, Wilmington.
C. M. COX, *Secretary*, Newark.
C. F. PIERCE, *Treasurer*, Wilmington.
Delegate to A. D. A.: P. A. Traynor, Wilmington.

DELAWARE STATE BOARD OF HEALTH—1944

Bruce Barnes, M. D., *President*, Seaford; Mrs. F. G. Tallman, *Vice-President*, Wilmington; Mrs. Caroline Hughes, *Secretary*, Middletown; J. D. Niles, M. D., Middletown; W. T. Chipman, M. D., Harrington; W. H. Speer, M. D., Wilmington; W. B. Atkins, D. D. S., Millsboro; Mrs. C. M. Dillon, Wilmington; Edwin Cameron, M. D., *Executive Secretary*, Dover.

MEDICAL COUNCIL OF DELAWARE

Hon. Daniel J. Layton, *President*; J. S. McDaniel, M. D., *Secretary*; A. K. Lotz, M. D.

BOARD OF EXAMINERS, MEDICAL SOCIETY OF DELAWARE

J. S. McDaniel, *President and Secretary*; Wm. Marshall, *Assistant Secretary*; W. E. Bird, W. T. Chipman, P. R. Smith.